

Cold Rolled Sheet Piling

Catalogue



Cold Rolled Sheet Piling

Product & Standard



As a member of Arcelor group - a leading Global Steel Producer, Oriental Sheet Piling is the "One Stop Steel Sheet Pile Solutions Provider" in this region.

Our Cold Rolled Sheet Piling Plant at the Southern tip of Peninsula Malaysia provides

- Tight delivery schedule
- Supply flexibility

Our Services :

- ✓ Wide range of Hot Rolled & Cold Rolled Sheet Piling Products.
- ✓ Design & Technical Support.
- ✓ Logistic flexibility.
- ✓ Installation assistance & advice on coating, tie rod & strutting system.
- ✓ Construction detailing & experience.

Cold Rolled Sheet Piling can offer benefits as below :

- ✓ Single piece sheet pile produced in a continuous process **without jointing / welding**.
- ✓ **Flexible production process** to offer client's requirement in product length, strength and delivery schedule.
- ✓ **Excellent strength/weight ratio** to save construction cost.
- ✓ **Precise and proven interlocking system (Hook & Grip)** to international standards to ease the pile driving and forming continuous wall. The standards include **prEN 1993-5: 2003 - Design of steel structures Part 5: Piling** and **BS EN 10249 Cold formed Sheet Piling of Non Alloy Steels**.
- ✓ Roll forming technology **guarantees superior surface finishes** to sharp and clean contours without die marks.
- ✓ **Accurate dimension** to meet even tight tolerances.
- ✓ **Consistence & reliable quality products** from mass production.

Product Complies with International Standards

BS EN 10249 : 1995, Cold Formed Sheet Piling: Definitions to International Standards

Cold Formed Sheet Piling of Non Alloy Steels. Products made by cold forming on a rolling machine.

ASTM A857, Standard Specification for Steel Sheet Piling, Cold Formed, Light Gage

Sheet piling produced to this specification is usually manufactured from coils, decoiled and fed through a multi stand **(roll) forming** mill at ambient temperature.

Cold Rolled Sheet Piling

Latest Rolling Technologies

Cold Rolling Process



Raw material i.e. steel strip is continuously fed in to machine line



Cold rolled sheet piling is formed by series of designed roller stations



Sheet piling is formed into corrugated profiles to achieve strength and toughness



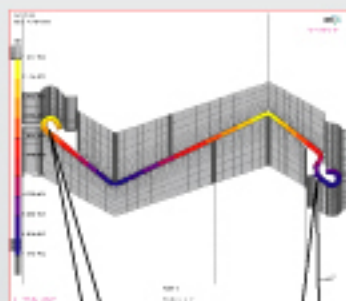
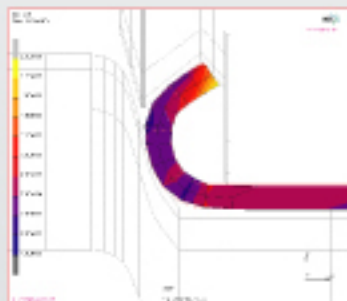
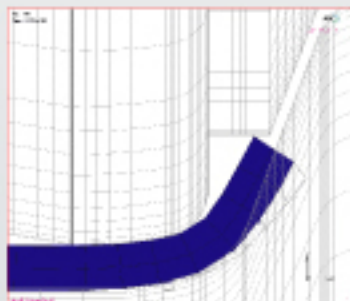
Precise and consistent shape formed and readily used

Products Quality And Standard Guaranteed by Finite Element Analysis

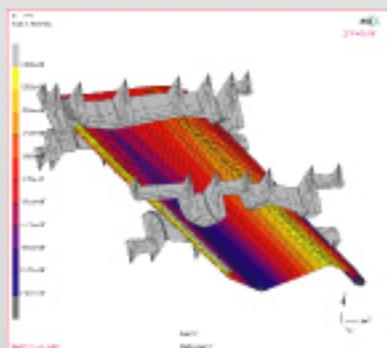
Through innovation and benefits of latest technology, Cold Rolled Sheet Piling is formed by continuous flat steel strip rolled into corrugated profile at ambient temperature. The controlled cold working by rolling process will ensure the strength of the material and good section properties per weight.

Extensive Finite Element Analysis were carried out in roll forming to ensure product quality:

- ✓ Numerical by complex FEA analysis to confirm machine rolling design.
- ✓ Computer simulations were derived to ensure final profile that can be produced to meet tight cold formed delivery & dimension tolerances.



Calculation of deformation forces to ensure meeting cross section dimensions



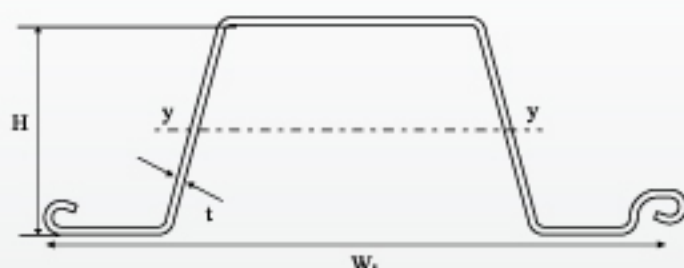
Proven Interlock System & FEA Simulated

Stress developed in rolling process does not exceed limit. Controlled cold working by rolling process will maintain metallurgical properties, control remaining residual stress & prevent microcracking. This will ensure ductility of cold rolled sheet piling & prevent brittle (sudden) failure.

Cold Rolled Sheet Piling

OU Section

OU



The advantages of OU sections piles are multiple:

- ✓ An innovative section to ease sheet piling installation that is adjacent to existing building.
- ✓ It is suitable to use for canalization work and river bank structural protection.
- ✓ Effective permeability cut off system.

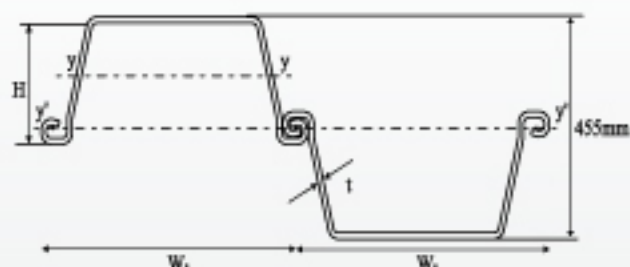
Type	S = Single	Thickness (t) (mm)	Single pile c/c Width (Ws) (mm)	Inner Height (H) (mm)	Section Area (A) (cm ²)	Weight (Wt) (kg/m)	Moment of Inertia (I) (cm ⁴)	Section Modulus (Z) (cm ³)
OU 6	Per S	4.0	730	245	49.99	39.4	5,089	438
	Per m of wall					53.9	6,971	600
OU 6A	Per S	4.5	730	245	56.24	44.3	5,711	475
	Per m of wall					60.6	7,823	650
OU 7A	Per S	5.0	730	245	62.48	49.1	6,330	548
	Per m of wall					67.3	8,671	750
OU 8	Per S	5.5	730	245	68.73	54.0	6,946	584
	Per m of wall					74.0	9,515	800
OU 9	Per S	6.0	730	245	74.98	58.8	7,559	657
	Per m of wall					80.6	10,355	900
OU 9A	Per S	6.5	730	245	81.23	63.7	8,170	694
	Per m of wall					87.2	11,192	950
OU 10	Per S	7.0	730	245	87.48	68.5	8,778	730
	Per m of wall					93.9	12,024	1,000
OU 11	Per S	7.5	730	245	93.73	73.4	9,383	803
	Per m of wall					100.5	12,853	1,100
OU 11A	Per S	8.0	730	245	99.97	78.2	9,985	840
	Per m of wall					107.1	13,678	1,150
OU 12	Per S	8.5	730	245	106.22	83.0	10,585	905
	Per m of wall					113.7	14,500	1,240

S : considered neutral axis y-y

Cold Rolled Sheet Piling

OT Section

OT



The advantages of OT sections are multiple:

- ✓ The combination of great wave depth of section gives excellent statical properties.
- ✓ The symmetrical form of the single element has made these sheets particularly convenient for re-use.
- ✓ Easy fixing of tie rods and swiveling attachments, even under water.

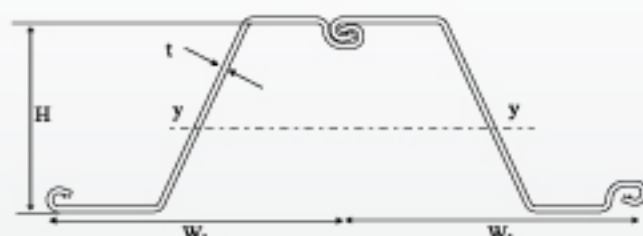
Type	S = Single D = Double	Thickness (t) (mm)	Single pile c/c Width (Ws) (mm)	Inner Height (H) (mm)	Section Area (A) (cm ²)	Weight (Wt) (kg/m)	Moment of Inertia (I) (cm ⁴)	Section Modulus (Z) (cm ³)
OT 14	Per S	6.50	605	260	74.29	58.4	5,840	376
	Per D					116.9	40,877	1,694
	Per m of wall					96.6	33,783	1,400
OT 15A	Per S	7.00	605	260	80.01	62.9	6,294	417
	Per D					125.7	44,060	1,876
	Per m of wall					103.9	36,413	1,550
OT 16A	Per S	7.50	605	260	85.72	67.3	6,750	444
	Per D					134.5	47,249	1,997
	Per m of wall					111.2	39,049	1,650
OT 17A	Per S	8.00	605	260	91.44	71.7	7,207	471
	Per D					143.4	50,446	2,118
	Per m of wall					118.5	41,691	1,750
OT 18A	Per S	8.50	605	260	97.15	76.1	7,664	197
	Per D					152.2	53,649	2,239
	Per m of wall					125.8	44,338	1,850
OT 19A	Per S	9.00	605	260	102.87	80.5	8,123	524
	Per D					161.0	56,860	2,360
	Per m of wall					133.0	46,992	1,950
OT 21	Per S	9.50	610	260	108.58	85.6	86,523	569
	Per D					171.1	60,573	2,562
	Per m of wall					140.3	49,650	2,100
OT 22	Per S	10.00	610	260	114.30	90.0	9,118	596
	Per D					180.0	63,824	2,684
	Per m of wall					147.5	52,315	2,200
OT 23	Per S	10.50	610	260	120.01	94.4	9,583	624
	Per D					188.7	67,083	2,806
	Per m of wall					154.7	54,986	2,300
OT 24	Per S	11.00	610	260	125.73	98.8	10,050	651
	Per D					197.5	70,348	2,925
	Per m of wall					161.9	57,662	2,400
OT 25	Per S	11.50	610	260	131.44	103.2	16,360	686
	Per D					206.3	73,620	3,087
	Per m of wall					169.1	60,344	2,530
OT 26	Per S	12.00	610	260	137.16	107.5	10,986	705
	Per D					215.1	76,899	3,172
	Per m of wall					176.3	63,032	2,600
OT 27A	Per S	12.70	610	260	145.16	113.7	11,643	746
	Per D					227.3	81,503	3,355
	Per m of wall					186.3	66,806	2,750

S: considered neutral axis y-y D: considered neutral axis y'-y'

Cold Rolled Sheet Piling

OZ Section

OZ



OZ sections formed continuous sheet piling wall with the interlocks located symmetrically on both sides of the neutral axis. This will offer profiles with effective section properties per weight. The OZ series has the following advantages:

- ✓ An extremely competitive section modulus to mass ratio.
- ✓ Increased inertia and reduced deflection for the most economical solution.
- ✓ Large width resulting in good installation performance.

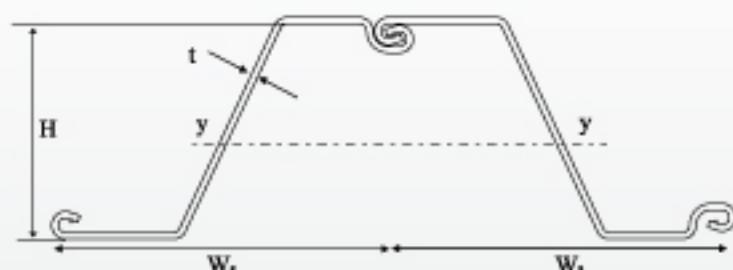
Type	S = Single D = Double	Thickness (t) (mm)	Single pile c/c Width (Ws) (mm)	Inner Height (H) (mm)	Section Area (A) (cm ²)	Weight (Wt) (kg/m)	Moment of Inertia (I) (cm ⁴)	Section Modulus (Z) (cm ³)
OZ 13A	Per S	6.50	650	390	69.3	54.2	17,688	878
	Per D					108.3	35,376	1,756
	Per m of wall					83.3	27,212	1,350
OZ 14A	Per S	7.00	650	390	74.7	58.3	19,039	943
	Per D					116.7	38,078	1,886
	Per m of wall					89.7	29,291	1,450
OZ 15A	Per S	7.50	650	390	80.0	62.5	20,389	1,008
	Per D					125.0	40,778	2,016
	Per m of wall					96.1	31,368	1,550
OZ 16A	Per S	8.00	650	390	85.3	66.6	21,739	1,073
	Per D					133.3	43,477	2,146
	Per m of wall					102.5	33,444	1,650
OZ 17A	Per S	8.50	650	390	90.7	70.8	23,087	1,138
	Per D					141.6	46,174	2,276
	Per m of wall					108.9	35,518	1,750
OZ 18A	Per S	9.00	650	390	96.0	75.0	24,434	1,203
	Per D					149.9	48,868	2,406
	Per m of wall					115.3	37,590	1,850
OZ 19A	Per S	9.50	650	390	101.3	79.1	25,780	1,268
	Per D					158.2	51,560	2,536
	Per m of wall					121.7	39,661	1,950
OZ 20A	Per S	10.00	650	390	106.7	83.3	27,125	1,333
	Per D					166.5	54,250	2,666
	Per m of wall					128.1	41,730	2,050

S, D: considered neutral axis y-y

Cold Rolled Sheet Piling

OZ Section

OZ



Type	S = Single D = Double	Thickness (t) (mm)	Single pile c/c Width (Ws) (mm)	Inner Height (H) (mm)	Section Area (A) (cm ²)	Weight (Wt) (kg/m)	Moment of Inertia (I) (cm ⁴)	Section Modulus (Z) (cm ³)
OZ 22	Per S	9.00	645	420	102.9	80.8	31,112	1,419
	Per D					161.5	62,224	2,838
	Per m of wall					125.2	48,236	2,200
OZ 23A	Per S	9.50	645	420	108.6	85.2	32,850	1,516
	Per D					170.4	65,700	3,032
	Per m of wall					132.1	50,930	2,350
OZ 24A	Per S	10.00	645	420	114.3	89.7	34,587	1,580
	Per D					179.4	69,175	3,160
	Per m of wall					139.1	53,624	2,450
OZ 26	Per S	10.50	645	420	120.0	94.2	36,327	1,677
	Per D					188.3	72,654	3,354
	Per m of wall					146.0	56,321	2,600
OZ 27	Per S	11.00	645	420	125.7	98.6	38,067	1,742
	Per D					197.2	76,135	3,484
	Per m of wall					152.9	59,019	2,700
OZ 28A	Per S	11.50	645	420	131.4	103.1	39,808	1,838
	Per D					206.2	79,616	3,677
	Per m of wall					159.8	61,718	2,850
OZ 29A	Per S	12.00	645	420	137.2	107.6	41,512	1,903
	Per D					215.1	83,024	3,806
	Per m of wall					166.8	64,360	2,950
OZ 31A	Per S	12.70	645	420	145.2	113.8	43,979	2,032
	Per D					227.6	87,959	4,064
	Per m of wall					176.4	68,185	3,150




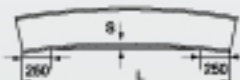

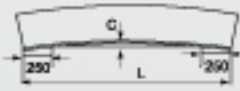
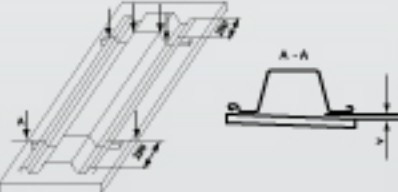

S, D: considered neutral axis y-y

Cold Rolled Sheet Piling

Delivery Condition

All sheet piles are formed in continuous rolling process to the required sections with interlock able to fit into each other

Tolerances On Sheet Piles (reference standard: BS EN 10249)

Characteristics	Figures	Nominal size (mm)	Tolerances (mm)
Sectional Height (h)		$h \leq 200$ $200 < h \leq 300$ $300 < h \leq 400$ $400 < h$	± 4 ± 6 ± 8 ± 10
Sectional Width (w)		single sheet pile double sheet piles	$\pm 2\% W$ $\pm 3\% W$
Sectional thickness (e)		$e = 3$ $3.00 < e \leq 4.00$ $4.00 < e \leq 5.00$ $5.00 < e \leq 6.00$ $6.00 < e \leq 8.00$ $8.00 < e \leq 10.0$ $10.0 < e \leq 12.7$	± 0.26 ± 0.27 ± 0.29 ± 0.31 ± 0.35 ± 0.40 ± 0.50
Bending (Deflection S)			0.25% L
Curving (Deflection c)			0.25% L
Twist (Dimension v)			2% L with max 100mm
Length			$\pm 50\text{mm}$
Squareness of ends (Out of squareness of end cuts)			2% of width
Mass of Section (Difference between total actual and total theoretical mass delivered)			$\pm 7\% \text{ max}$

Steel Grade

Grade	Min. yield point N/mm ²	Min. tensile strength N/mm ²	Min. elongation %	Comparable to other standards		
				France	UK BS 4360	Germany
S 235 JRC	235	340	26	E 24-2	Gr. 40B	St 37-2
S 275 JRC	275	410	22	E 28-2	Gr. 43B	St 44-2
S 355 JOC	355	490	22	E 36-3	Gr. 50C	St 52-3U

Cold Rolled Sheet Piling

Application & Installation

Application

The improved Cold Rolled Sheet Piling section modulus / weight, thickness up to 12.7 mm & high yield steel grade up to S 355 J0C has made the sections suitable for the following applications:

- ✓ Structural protection for canalization
- ✓ Retaining wall system
- ✓ Effective permeability cut off system or confinement walls at polluted site
- ✓ Waterfront structure for port facilities & jetty
- ✓ Locks and dam
- ✓ Piled foundations
- ✓ Temporary excavations
- ✓ Trenches for sewerage and drainage works
- ✓ Bridge abutments
- ✓ Power plants construction
- ✓ Construction of noise barrier

Installation

The technology advancement has made installation of sheet piling possible for various jobsite environment & execution requirements. Installation guidelines can be referred to BS EN 12063:1999, Execution of special geotechnical work - Sheet pile walls and Arcelor Piling Handbook.

Generally 3 types of installation method available:

(i) **Impact driving**

Best method for driving sheet piles into difficult ground or completing deep penetration into hard soils. The downside is that it can be noisy and not suitable for sensitive or restricted area.

(ii) **Vibrodriving**

Fastest & most economical method. Vibration and noise level can be kept to minimum with new & right equipment (frequency & force) is used and the site which is not too sensitive.

(iii) **Pressing** (vibrationless hydraulic jacking)

Best system for avoiding vibration and noise disturbance when driving sheet piles on sensitive site area. Best suited for the installation of piles next to buildings and party walls. It eliminates the need for expensive property surveys and minimizes the risk of disturbance.

Driving stress developed during installation operation can be evaluated based on types of sheet piles, ground conditions & driving equipment. Please refer to Technical Department of Oriental Sheet Piling for further clarification.



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